UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/696,622	10/29/2003	Narasimha R. Valieti	VRT0093US	5515

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EXAMINER
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ART UNIT	PAPER NUMBER
2189	

DATE MAILED: 05/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<table>
<tr><td rowspan="2">Office Action Summary</td><td>Application No.</td><td>Applicant(s)</td><td></td></tr>
<tr><td>10/696,622</td><td>VALIETI ET AL.</td><td></td></tr>
<tr><td></td><td>Examiner</td><td>Art Unit</td><td></td></tr>
<tr><td></td><td>Horace L. Flournoy</td><td>2189</td><td></td></tr>
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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>21 February 2006</u>.

2a)☒ This action is **FINAL.**   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-20</u> is/are pending in the application.

　　4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-7 and 10-20</u> is/are rejected.

7)☒ Claim(s) <u>8 and 9</u> is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>29 October 2003</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

　　Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

　　Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

　　a)☐ All b)☐ Some * c)☐ None of:

　　　　1.☐ Certified copies of the priority documents have been received.

　　　　2.☐ Certified copies of the priority documents have been received in Application No. _____.

　　　　3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

　　* See the attached detailed Office action for a list of the certified copies not received.

DETAILED ACTION

Response to Amendment

This Office action has been issued in response to amendment filed <u>21 February</u> <u>2006</u>. Claims 1-20 are pending. Applicant's arguments have been carefully and respectfully considered, but they are not entirely persuasive, as will be discussed in more detail below, even in light of the instant amendments. This action has been made FINAL.

Claim Rejections - 35 USC § 103

The claim rejections of 35 USC 103 of the previous office action are hereby withdrawn.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-20 are rejected under 35 U.S.C. 102(e) as being anticipated by **Dalal et al. (U.S. PG PUB No. 2004/0123063 hereafter referred to as Dalal).**

With respect to **independent claims 1 and 12,**

"A method comprising: a computing node in a network **[Dalal discloses in paragraph [0120], "...in which the host to which the user is currently connected appears as a node." See FIG. 32]** *creating a description of a data volume layout,* **[Dalal discloses in paragraph [0114], "Intent 1122 captures information such as user requirements 1102B, including high-level descriptions of characteristics requested of the logical volume (i.e., "provide high performance") and/or rules or capabilities used to configure the logical volume for an intended use."]** *wherein the data volume is composed from two or more data storage devices on the network;* **[Dalal discloses this limitation e.g. in paragraph [0005]]** *first, second and third devices* each *storing a* respective *copy of the data volume layout description or respective modified versions thereof in respective memories of the first, second and third devices;* **[Dalal discloses this limitation e.g. in paragraph [0267]]** *transmitting data input/output (I/O) transactions between the first device and the second device; transmitting data (I/O) transactions between the first device and the third device."* **[Dalal also discloses in paragraph [0027], "By placing data on multiple disks, I/O operations can overlap in a balanced way, improving performance." Dalal teaches I/O operation between all devices.]**

With respect to **independent claims 18, 19, and 20,**

"A computer readable medium storing instructions, wherein the instructions are executable by a processor in a second device in a network containing a first device, the second device, and a third device, **[disclosed in FIG. 10]** *wherein the network stores a data volume,* **[disclosed, e.g. in paragraph [0005]]** *wherein the first device is configured to transmit I/O transactions to the second device, and wherein the first device is configured to transmit I/O transactions to the third device,* **[Dalal also discloses in paragraph [0027], "By placing data on multiple disks, I/O operations can overlap in a balanced way, improving performance." Dalal teaches I/O operation between all devices.]** *the method comprising: the second device receiving and storing in memory thereof a description of a data volume layout created and transmitted by the first data device;* **[Dalal discloses this limitation e.g. in paragraphs [0267] and [0182]]** *the second device receiving an write I/O transaction from the first device,* **[Dalal discloses this limitation e.g. in paragraph [0217]]** *wherein the write I/O transaction comprises data D; after receiving the write I/O transaction, the second device generating another transaction to write data D; the second device transmitting the other transaction to the third device."* **[Dalal discloses this limitation in paragraph [0013], "Storage devices have become increasingly sophisticated, providing such capabilities as allowing input and output to be scheduled through multiple paths to a given disk within a disk array. Such disk arrays are referred to herein as multi-path arrays. Storage array**

130 is a multi-path array of multiple storage devices, of which storage

device 136 is an example."]

With respect to **claims 2 and 13,**

"The method of claim 1 wherein the data volume layout description relates virtual

storage objects of the data volume to other virtual storage objects of the data

volume." is disclosed in paragraphs [0018]-[0022] and [0085].

Dalal discloses in **paragraph [0022], "None of the associations**

described above between virtual objects making up logical volumes are

permanent; the relationships between virtual objects can be changed. For

example, individual disks can be added on-line to increase plex capacity,

and individual volumes can be increased or decreased in size without

affecting the data stored within."

Dalal teaches the data volume layout description **(paragraphs [0085]**

and [0018]) relates virtual storage objects **[The relationships between virtual**

objects] of the data volume **[virtual objects making up logical volumes]** to

other virtual storage objects of the data volume.

With respect to **claims 3 and 14,**

"The method of claim 1 wherein the data volume layout description relates virtual

storage objects of the data volume to one or more data storage systems of the

network." is disclosed in paragraphs [0086] and [0102], FIG. 10, elements 1015

and 1019, and claim 2 above.

Dalal discloses in **paragraph [0086]**, **"In "Obtain Available Storage**

Information" step 820, information is gathered about the available storage

for implementing the user requirements. This information can be gathered

from storage devices directly attached to the host running the system

software, via a network from other hosts directly attached to other storage

devices, and from servers on a storage area network." Dalal also discloses

in **paragraph [0102]**, **"Storage information collector 1015 collects**

information from hosts for storage devices, such as host 1016 for storage

device 1017, storage array 1018, and storage area network 1019."

With respect to **claims 4 and 15**,

"The method of claim 1 wherein the first device comprises a host node, wherein

the second device comprises a first data storage system that stores a first portion

of data of the data volume, and wherein the third device comprises a second

data storage system that stores a second portion of data of the data volume." is

disclosed in FIG. 1, elements 110 and 130, and paragraph [0013].

Dalal discloses in **paragraph [0013]**, **"Storage array 130 is a multi-path**

array of multiple storage devices, of which storage device 136 is an

example. Storage array 130 is connected to fibre channel network 122 via

array port 132."

Dalal teaches in **FIG. 1** a host node **[Host element 110]** (first device).

The second and third devices are taught in **[Storage Array element 130]**

(first/second data storage systems). Also, Dalal teaches in **FIG. 32** clients

(elements 3210, 3220, 3230) as well as devices (elements 3260A/B), which are each interpreted as first/second data storage systems.

With respect to **claim 5**,

"The method of claim 1 wherein the computing node is contained within the first, second, or third device." is disclosed in paragraph [0309], and FIG. 32, elements 3210, 3220 and 3230.

Dalal discloses in **paragraph [0309]**, **"Client systems 3210, 3220 and 3230 are able to access information on storage server 3240A or 3240B using, for example, a web browser or other client software (not shown). Such a client allows client systems 3210, 3220 and 3230 to access data hosted by storage server 3240A or 3240B or one of storage devices 3260A(1)-(N), 3260B(1)-(N), 3280(1)-(N) or intelligent storage array 3290."**

Dalal teaches that the computing node is contained within the first, second, or third device **[Client systems 3210, 3220 and 3230].**

With respect to **claim 6**,

"The method of claim 1 wherein the first device comprises a host node, wherein second device comprises a data storage system that stores a portion of data of the data volume, and..." is disclosed, as **stated above, in claim 4**.

"... wherein the third device comprises a switch coupled between the host node and the data storage system." is disclosed in **FIG. 1 element 120**.

Dalal teaches a third device that comprises a switch **[Switch element**

120] coupled between the host node **[Host element 110]** and the data storage

system **[Storage Array 130]**.

With respect to **claims 7, 16, and 17,**

"The method of claim 4 further comprising: the host node generating a write I/O

transaction to write new data, wherein the write I/O transaction comprises the

new data" is disclosed in paragraph [0036] and FIG. 11.

Dalal discloses in **paragraph [0036]**, **"...the disk arrays have**

independent I/O paths to the host computer so that there is no single point

of failure."

Dalal teaches the host node **[host computer]** has independent I/O paths

to the disk arrays for requests.

[Note: The examiner interprets the limitations "generating" followed

by "transmitting" a transaction as a request.] See below. Also the

limitation "new data" is interpreted as new data to the system or new data

to the particular host.

"...the host node transmitting the write I/O transaction to only the first data

storage system;" is disclosed in paragraph [0217].

Dalal discloses in **paragraph [0217]**, **"...each request is not likely to**

finish at exactly the same time (because each disk does not receive

identical I/O requests--each disk gets a different set of read requests)..."

Dalal teaches the host node transmits **[request]** the write I/O transaction **[I/O request]** to only the first data storage system **[each disk gets a different set of read requests]**.

"...after receiving the write I/O data transaction, the first data storage system generating another transaction to write the new data;" is disclosed in paragraph [0217].

Dalal discloses in **paragraph [0217]**, **"...write requests cannot be issued in parallel, but happen one after the other."**

"...the first data storage system transmitting the other transaction to the second data storage system." is disclosed supra. **[See Note above]**

Dalal discloses in **paragraph [0217]**, **"Each logical write must be translated to n physical writes to each of the n mirrors. All n writes can be issued concurrently, and all will finish in about the same time."**

Dalal teaches in response to receiving a write I/O transaction or transaction **[logical write]**, the data volume layout description of the storage system is accessed from that storage system's memory **[Each logical write must be translated to n physical writes to each of the n mirrors]**.

With respect to **claim 10**,

"The method of claim 4 further comprising: the host node generating a write I/O transaction to write new data, wherein the write I/O transaction comprises the new data; the host node transmitting the write I/O transaction to the first data storage system;" is disclosed in **claim 7** above.

"...after receiving the write I/O data transaction, the first data storage system

accessing the data volume layout description or the modified version thereof

stored in memory of the first data storage system;" is disclosed in **claim 8** above.

"... after accessing the data volume layout description or the modified version

thereof stored in memory of the first data storage system, the first data storage

system writing all the new data to separate memory locations within the first data

storage system." is disclosed in paragraph [0217].

Dalal discloses in **paragraph [0217]**, **"Each logical write must be**

translated to n physical writes to each of the n mirrors. All n writes can be

issued concurrently, and all will finish in about the same time."

Dalal teaches writing all the new data to separate memory locations

within the first data storage system **[Each logical write must be translated to n**

physical writes to each of the n mirrors].

With respect to **claims 11 and 17,**

"The method of claim 1 further comprising: the computing node modifying the

data volume layout description; the first, second and third devices overwriting

their respective data volume layout descriptions or their respective modified

versions of the data volume layout descriptions with a copy of the modified data

volume layout description or the respective modified versions thereof." is

disclosed in paragraph [0299].

Dalal discloses in **paragraph [0299]**, **"...storage allocator software can**

be used to configure other available hardware to meet the user's functional

requirements. The storage allocator can be used at a very low level, by

administrators intimately familiar with the features of available storage devices, to provide a high level of control over how logical volumes are configured. In addition, the storage allocator provides great flexibility and can also be used by users without detailed technical knowledge."

Dalal teaches a computing node [storage allocator] modifying the data volume layout description [configure other available hardware]; the first, second and third devices [logical volumes] overwriting their respective data volume layout descriptions or their respective modified versions of the data volume layout descriptions with a copy of the modified data volume layout description or the respective modified versions thereof [storage allocator software can be used to configure other available hardware to meet the user's functional requirements].

[Note: With regards to claims 12-19, please see paragraphs [0312]-[0314], as well as the 35 U.S.C. rejection below, both of which anticipate the use of a computer readable medium to execute functions in hardware as claimed above]

With respect to claims 12-19, Dalal discloses in paragraphs [0312]-[0313], "The foregoing detailed description has set forth various embodiments of the present invention via the use of block diagrams, flowcharts, and examples. It will be understood by those within the art that each block diagram component, flowchart step, operation and/or component illustrated by the use of examples can be implemented, individually and/or collectively, by a

wide range of hardware, software, firmware, or any combination thereof...The present invention has been described in the context of fully functional computer systems; however, those skilled in the art will appreciate that the present invention is capable of being distributed as a program product in a variety of forms, and that the present invention applies equally regardless of the particular type of signal bearing media used to actually carry out the distribution. Examples of signal bearing media include recordable media such as floppy disks and CD-ROM, transmission type media such as digital and analog communications links, as well as media storage and distribution systems developed in the future."

With respect to **claim 13**,

"The computer readable medium of claim 12 wherein the data volume layout description relates virtual storage objects of the data volume to other virtual storage objects of the data volume." is disclosed as **stated supra in claim 2**.

With respect to **claim 14**,

"The computer readable medium of claim 12 wherein the data volume layout description relates virtual storage objects of the data volume to one or more data storage systems of the network." is disclosed as **stated supra in claim 3**.

With respect to **claim 15**,

"The computer readable medium of claim 12 wherein the first device comprises a host node, wherein the second device comprises a first data storage system that

stores a first portion of data of the data volume, and wherein the third device

comprises a second data storage system that stores a second portion of data of

*the data volume." is disclosed as **stated supra in claim 4**.*

With respect to **claim 16**,

"The computer readable medium of claim 15 wherein the method further

comprises: the host node generating a write I/O transaction to write new data,

wherein the write I/O transaction comprises the new data; the host node

transmitting the write I/O transaction to only the first data storage system." is

disclosed as **stated supra in claim 7.**

With respect to **claim 17**,

"The computer readable medium of claim 12 wherein the method further

comprises: the first device modifying the data volume layout description to create

a modified data volume layout description;" is disclosed as **stated supra in**

claim 11.

"...the first device transmitting a copy of the modified data volume layout

description or a modified version thereof to the second device." is disclosed as

stated supra in claim 7.

Allowable Subject Matter

Claims 8 and 9, are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

ARGUMENTS CONCERNING PRIOR ART REJECTIONS

1ST POINT OF ARGUMENT:

With respect to the arguments on page 9 of the applicant's remarks, Dalal does in fact disclose a *"first, second and third devices each storing a respective copy of the data volume layout description or respective modified versions thereof"* in paragraph [0267] as stated above.

2ND POINT OF ARGUMENT:

With respect to the arguments on page 9 of the applicant's remarks, acknowledgment is made of applicant's arguments with regard to claim 8. The examiner agrees with the applicant's arguments.

3rd POINT OF ARGUMENT:

With respect to the argument on page 10 of the applicant's remarks, the examiner hereby withdraws the 35 USC 103 rejection. See above for details.

CONCLUSION

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time

policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later

than SIX MONTHS from the mailing date of this final action.

Direction of Future Correspondences

Any inquiry concerning this communication or earlier communication from the

examiner should be directed to Horace L. Flournoy whose telephone number is (571)

272-2705. The examiner can normally be reached on Monday through Friday 8:00 AM

to 5:30 PM (ET).

Important Note

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Reginald G. Bragdon can be reached on (571) 272-4204. The fax phone

numbers for the organization where this application or proceeding is assigned is (703) 746-7239.

Information regarding the status of an Application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or PUBLIC PAIR. Status information for unpublished applications is available through Private Pair only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-2100.

Horace L. Flournoy

Patent Examiner

Art unit: 2189
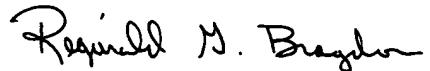
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